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NEWS EXPRESS JUNE 13 CURRENT WINDOWS VERSION IS V8.0, CURRENT MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP), AND CURRENT DISCOVER FILE IS DATED 13 JUNE 2005

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FULL ESTIMATED COST

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0.21

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STRUCTURE FILE UPDATES: 30 SEP 2005 HIGHEST RN 864353-93-5  
DICTIONARY FILE UPDATES: 30 SEP 2005 HIGHEST RN 864353-93-5

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\*  
\*\*\*\*\*

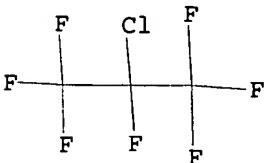
Structure search iteration limits have been increased. See HELP SLIMITS  
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information enter HELP PROP at an arrow prompt in the file or refer  
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<http://www.cas.org/ONLINE/DBSS/registryss.html>

=>  
Uploading C:\Program Files\Stnexp\Queries\fluor.str

L1 STRUCTURE uploaded

=> d l1  
L1 HAS NO ANSWERS  
L1 STR



Structure attributes must be viewed using STN Express query preparation.

=> s l1 sss full  
FULL SEARCH INITIATED 10:15:34 FILE 'REGISTRY'  
FULL SCREEN SEARCH COMPLETED - 847 TO ITERATE

100.0% PROCESSED 847 ITERATIONS  
SEARCH TIME: 00.00.01

3 ANSWERS

L2 3 SEA SSS FUL L1

=> file caplus  
COST IN U.S. DOLLARS  
FULL ESTIMATED COST

	SINCE FILE ENTRY	TOTAL SESSION
	161.76	161.97

FILE 'CAPLUS' ENTERED AT 10:15:48 ON 01 OCT 2005  
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FILE COVERS 1907 - 1 Oct 2005 VOL 143 ISS 15  
FILE LAST UPDATED: 30 Sep 2005 (20050930/ED)

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This file contains CAS Registry Numbers for easy and accurate substance identification.

=> s 12  
L3 67 L2

=> s 12/prep  
67 L2  
3364700 PREP/RL  
L4 27 L2/PREP  
(L2 (L) PREP/RL)

=> s 14 and hydrogen fluoride  
888528 HYDROGEN  
5622 HYDROGENS  
891686 HYDROGEN  
(HYDROGEN OR HYDROGENS)  
242264 FLUORIDE  
43811 FLUORIDES  
257550 FLUORIDE  
(FLUORIDE OR FLUORIDES)  
22712 HYDROGEN FLUORIDE  
(HYDROGEN (W) FLUORIDE)  
L5 13 L4 AND HYDROGEN FLUORIDE

=> s 15 and chlorine  
125794 CHLORINE  
770 CHLORINES  
126291 CHLORINE  
(CHLORINE OR CHLORINES)  
L6 8 L5 AND CHLORINE

=> s 15 ibib ab hitstr 1-13  
MISSING OPERATOR L5 IBIB  
The search profile that was entered contains terms or nested terms that are not separated by a logical operator.

=> d 15 ibib ab hitstr 1-13

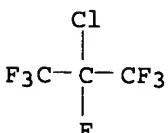
L5 ANSWER 1 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 2005:564604 CAPLUS  
DOCUMENT NUMBER: 143:84365  
TITLE: Selective chromium catalyst compositions, their preparation and use for producing 1,1,2-trichloropentafluoropropane  
INVENTOR(S): Sievert, Allen Capron; Rao, Velliur Nott Mallikarjuna  
PATENT ASSIGNEE(S): E.I. Dupont de Nemours and Company, USA  
SOURCE: PCT Int. Appl., 26 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005058489	A1	20050630	WO 2004-US42157	20041215
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				

PRIORITY APPLN. INFO.: US 2003-529921P P 20031216  
AB A selective catalyst composition is disclosed which includes Cr<sub>2</sub>O<sub>3</sub> having a BET surface area of from about 1 to about 7 m<sup>2</sup>. Also disclosed are a method for preparing the selective catalyst composition which involves calcining α-chromium oxide having a BET surface area of at least 10 m<sup>2</sup>/g at a temperature of 1000 °C to about 1200 °C for a time sufficient to produce Cr<sub>2</sub>O<sub>3</sub> having a BET surface area of from about 1 to about 7 m<sup>2</sup>/g; and a selective catalyst composition prepared by treating a composition comprising

Cr<sub>2</sub>O<sub>3</sub> having a BET surface area of from about 1 to about 7 m<sup>2</sup>/g with a fluorinating agent. A process for the production of 1,1,2-trichloropentafluoropropane is also disclosed, which process involves reacting hydrogen fluoride, chlorine, and at least one halopropene of the formula CX<sub>3</sub>CCl = CC<sub>1</sub>X (where each X is independently F or Cl) to produce a product comprising CF<sub>3</sub>CClFCCl<sub>2</sub>F. The CF<sub>3</sub>CClFCCl<sub>2</sub>F is produced in the presence of a catalyst composition comprising Cr<sub>2</sub>O<sub>3</sub> having a BET surface area of from about 1 to about 7 m<sup>2</sup>/g or a catalyst composition prepared by treating such a catalyst composition with a fluorinating agent.

IT 76-18-6P  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(chlorofluorination and fluorination of hydrocarbons with selective chromium catalyst)  
RN 76-18-6 CAPLUS  
CN Propane, 2-chloro-1,1,1,2,3,3-heptafluoro- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 2 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 2005:78308 CAPLUS  
DOCUMENT NUMBER: 142:158395  
TITLE: Method for making fluorinated propanes  
INVENTOR(S): Tung, Hsueh Sung; Uhrich, Kevin D.  
PATENT ASSIGNEE(S): Honeywell International Inc., USA  
SOURCE: U.S. Pat. Appl. Publ., 5 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005020863	A1	20050127	US 2003-627018	20030725
WO 2005012214	A2	20050210	WO 2004-US23457	20040722
WO 2005012214	A3	20050324		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH,  
CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,  
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI,  
NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY,  
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW  
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM,  
AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,  
EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE,  
SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,  
SN, TD, TG

PRIORITY APPLN. INFO.: US 2003-627018 A 20030725

OTHER SOURCE(S): CASREACT 142:158395

AB A process for the manufacture of fluoropropanes, and more particularly, the manufacture of 1,1,1,3,3,3-hexafluoropropane (HFC-236fa) and 1,1,1,2,3,3,3-heptafluoropropane (HFC-227ea). This process utilizes 3-carbon byproducts, (i.e., waste materials) from other com. processes as raw materials and also avoids the use of hexafluoropropane as a reactant for making HFC-227ea, and is able to convert any three-carbon hydrocarbon, hydrochlorofluorocarbon, chlorofluorocarbon, or any halogenated propanes and produce high-valued three-carbon hydrofluorocarbons at significantly lower cost than current com. processes.

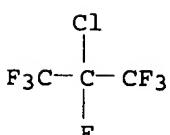
IT 76-18-6P, 2-Chloro-1,1,1,2,3,3,3-heptafluoropropane

RL: EPR (Engineering process); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation);  
PROC (Process)

(in a method for making fluorinated propanes)

RN 76-18-6 CAPLUS

CN Propane, 2-chloro-1,1,1,2,3,3,3-heptafluoro- (9CI) (CA INDEX NAME)



L5 ANSWER 3 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:182819 CAPLUS

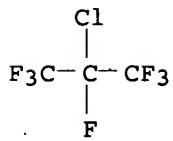
DOCUMENT NUMBER: 140:237530

TITLE: Processes and catalysts for the preparation of

INVENTOR(S) : 2-chloro-1,1,1,2,3,3,3-heptafluoropropane,  
 hexafluoropropene and 1,1,1,2,3,3,3-heptafluoropropane  
 Nappa, Mario J.; Rao, Velliur Nott Mallikarjuna;  
 Rosenfeld, H. David; Subramoney, Shekhar; Subramanian,  
 Munirpallam A.; Sievert, Allen C.  
 PATENT ASSIGNEE(S) : E.I. du Pont de Nemours and Company, USA  
 SOURCE : PCT Int. Appl., 29 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004018397	A1	20040304	WO 2003-US26331	20030821
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1539661	A1	20050615	EP 2003-793285	20030821
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
PRIORITY APPLN. INFO.:			US 2002-405222P	P 20020822
			WO 2003-US26331	W 20030821

OTHER SOURCE(S) : CASREACT 140:237530; MARPAT 140:237530  
 AB A process for the preparation of 2-chloro-1,1,1,3,3,3-heptafluoropropane is described which involves: (a) contacting a mixture comprising hydrogen fluoride, chlorine, and at least one starting material selected from halopropenes CX<sub>3</sub>CCl<sub>1</sub>:CX<sub>2</sub> (X = F, Cl; Y = H, Cl, F; provided that the number of X and Y which are F totals ≤ 6) and halopropanes CX<sub>3</sub>CCl<sub>1</sub>YC<sub>3</sub>, where each with a chlorofluorination catalyst in a reaction zone to produce a product mixture comprising CF<sub>3</sub>CCl<sub>1</sub>FCF<sub>3</sub>, HCl, HF, and underfluorinated halogenated hydrocarbon intermediates. The chlorofluorination catalyst comprises at least one chromium-containing component selected from (i) a crystalline alpha-chromium oxide where at least 0.05 atom% of the chromium atoms in the alpha-chromium oxide lattice are replaced by nickel, trivalent cobalt or both nickel and trivalent cobalt, provided that no more than 2 atom% of the chromium atoms in the alpha-chromium oxide lattice are replaced by nickel and that the total amount of chromium atoms in the alpha-chromium oxide lattice that are replaced by nickel and trivalent cobalt is no more than 6 atom%, and (ii) a fluorinated crystalline oxide of (i). Also described is a process for the manufacture of a mixture of HFC-227ea and hexafluoropropene by reacting a starting mixture comprising CFC-217ba and hydrogen in the vapor phase at an elevated temperature, optionally in the presence of a hydrogenation catalyst.  
 IT 76-18-6P, 2-Chloro-1,1,1,2,3,3,3-heptafluoropropane  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (processes and catalysts for the preparation of 2-chloro-1,1,1,2,3,3,3-heptafluoropropane and hexafluoropropene and 1,1,1,2,3,3,3-heptafluoropropane)  
 RN 76-18-6 CAPLUS  
 CN Propane, 2-chloro-1,1,1,2,3,3,3-heptafluoro- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

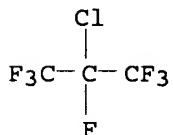
L5 ANSWER 4 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 2004:182755 CAPLUS  
 DOCUMENT NUMBER: 140:219737  
 TITLE: Nickel-substituted and mixed nickel-and-cobalt-substituted chromium oxide compositions, their preparation, and their use as catalysts and catalyst precursors  
 INVENTOR(S): Nappa, Mario J.; Rao, Velliyyur Nott Mallikarjuna; Rosenfeld, H. David; Subramoney, Shekhar; Subramanian, Munirpallam A.; Sievert, Allen C.  
 PATENT ASSIGNEE(S): E.I. du Pont de Nemours and Company, USA  
 SOURCE: PCT Int. Appl., 55 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004018095	A1	20040304	WO 2003-US26327	20030821
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1551551	A1	20050713	EP 2003-793282	20030821
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
PRIORITY APPLN. INFO.:			US 2002-405221P	P 20020822
			WO 2003-US26327	W 20030821

OTHER SOURCE(S): CASREACT 140:219737  
 AB A crystalline  $\alpha$ -chromium oxide where 0.05-2 atom % of the chromium atoms in the  $\alpha$ -chromium oxide lattice are substituted by nickel atoms, and optionally, addnl. chromium atoms in the alpha-chromium oxide lattice are substituted by trivalent cobalt atoms (provided that the total amount of the nickel atoms and the trivalent cobalt atoms in the  $\alpha$ -chromium oxide lattice is no more than 6 atom%) is disclosed. Also disclosed is a chromium-containing catalyst composition comprising as a chromium-containing component the crystalline substituted  $\alpha$ -chromium oxide; and a method for preparing a composition comprising the crystalline substituted  $\alpha$ -chromium oxide. The method comprises (a) co-precipitating a solid by adding ammonium hydroxide to an aqueous solution of a soluble divalent nickel salt, a soluble trivalent chromium salt, and optionally, a soluble divalent or trivalent cobalt salt, that contains at least three moles of nitrate per mol of chromium in the solution, has a nickel concentration 0.05-2 mol% of the total of nickel, chromium, and cobalt in

the solution, and has a combined concentration of nickel and cobalt of no more than 6 mol% of the total of nickel, chromium, and cobalt in the solution; and after at least 3 mol of ammonium per mol of chromium has been added to the solution; (b) collecting the co-precipitated solid formed in (a); (c) drying the collected solid; and (d) calcining the dried solid. Also disclosed is a chromium-containing catalyst composition comprising a chromium-containing component prepared by treating said crystalline substituted -chromium oxide with a fluorinating agent; and a process for changing the fluorine distribution (i.e., content and/or arrangement) in a hydrocarbon or halogenated hydrocarbon in the presence of a catalyst. The process involves using as the catalyst a composition comprising the crystalline substituted alpha-chromium oxide and/or the treated substituted  $\alpha$ -chromium oxide.

IT 76-18-6P, CFC 217ba  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (nickel-substituted and mixed nickel-and-cobalt-substituted chromium oxide compns., their preparation, and their use as catalysts and catalyst precursors)  
 RN 76-18-6 CAPLUS  
 CN Propane, 2-chloro-1,1,1,2,3,3-heptafluoro- (9CI) (CA INDEX NAME)

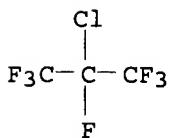


REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 5 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 2004:182753 CAPLUS  
 DOCUMENT NUMBER: 140:201451  
 TITLE: Cobalt-substituted chromium oxide compositions, their preparation, and their use as catalysts and catalyst precursors  
 INVENTOR(S): Nappa, Mario J.; Rao, Velliur Nott Mallikarjuna;  
 Rosenfeld, David H.; Subramoney, Shekhar; Subramanian,  
 Munirpallam A.; Sievert, Allen C.  
 PATENT ASSIGNEE(S): E.I. du Pont de Nemours and Company, USA  
 SOURCE: PCT Int. Appl., 68 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004018093	A2	20040304	WO 2003-US26326	20030821
WO 2004018093	A3	20040422		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW			
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FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR,  
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 EP 1539347 A2 20050615 EP 2003-793281 20030821  
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
 IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK  
 PRIORITY APPLN. INFO.: US 2002-405220P P 20020822  
 WO 2003-US26326 W 20030821  
**AB** A crystalline  $\alpha$ -chromium oxide where 0.05-6 atom% of the chromium atoms in the  $\alpha$ -chromium oxide lattice are replaced by trivalent cobalt ( $Co^{+3}$ ) atoms is disclosed. Also disclosed is a chromium-containing catalyst composition comprising as a chromium-containing component the crystalline cobalt-substituted  $\alpha$ -chromium oxide; and a method for preparing a composition comprising the crystalline cobalt-substituted  $\alpha$ -chromium oxide. The method involves (a) co-precipitating a solid by adding ammonium hydroxide to an aqueous solution of a soluble cobalt salt and a soluble trivalent chromium salt that contains  $\geq 3$  mol of nitrate/mol of chromium in the solution and has a cobalt concentration 0.05-6 mol% of the total concentration of cobalt and chromium in the solution; and after at least three moles of ammonium per mol of chromium in the solution has been added to the solution, (b) collecting the co-precipitated solid formed in (a); (c) drying the collected solid; and (d) calcining the dried solid. Also disclosed is a chromium-containing catalyst composition comprising a chromium-containing component prepared by treating the crystalline cobalt-substituted -chromium oxide with a fluorinating agent; and a process for changing the fluorine distribution (i.e., content and/or arrangement) in a hydrocarbon or halogenated hydrocarbon in the presence of a catalyst. The process involves using as the catalyst a composition comprising the crystalline cobalt-substituted  $\alpha$ -chromium oxide and/or the treated cobalt-substituted  $\alpha$ -chromium oxide.  
**IT** 76-18-6P, CFC 217ba  
**RL:** IMF (Industrial manufacture); PREP (Preparation)  
 (cobalt-substituted chromium oxide compns., their preparation, and their use as catalysts and catalyst precursors)  
**RN** 76-18-6 CAPLUS  
**CN** Propane, 2-chloro-1,1,1,2,3,3,3-heptafluoro- (9CI) (CA INDEX NAME)



L5 ANSWER 6 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 2003:282507 CAPLUS  
 DOCUMENT NUMBER: 138:289365  
**TITLE:** Materials and methods for the production and purification of chlorofluorocarbons and hydrofluorocarbons  
**INVENTOR(S):** Iikubo, Yuichi; Owens, Stephen; Cohn, Mitchel;  
 Brandstadter, Stephan M.; Hedrick, Vicki E.; Boggs, Janet K.; Chien, John Chengping; Sacarias, Julie  
**PATENT ASSIGNEE(S):** Pcbu Services, Inc., USA  
**SOURCE:** PCT Int. Appl., 66 pp.  
**DOCUMENT TYPE:** Patent  
**LANGUAGE:** English  
**FAMILY ACC. NUM. COUNT:** 1  
**PATENT INFORMATION:**

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003029173	A2	20030410	WO 2002-US30729	20020927
WO 2003029173	A3	20031030		
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW		
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG		
US 2003105368	A1	20030605	US 2001-966158	20010928
CA 2462100	AA	20030410	CA 2002-2462100	20020927
EP 1430010	A2	20040623	EP 2002-780379	20020927
	R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK		
CN 1558887	A	20041229	CN 2002-818973	20020927
JP 2005504824	T2	20050217	JP 2003-532428	20020927
US 2004102661	A1	20040527	US 2003-698579	20031031
US 2004102662	A1	20040527	US 2003-698730	20031031
US 2004102660	A1	20040527	US 2003-698731	20031031
US 2004102663	A1	20040527	US 2003-698923	20031031
US 2004102664	A1	20040527	US 2003-699491	20031031
ZA 2004002361	A	20050308	ZA 2004-2361	20040325
PRIORITY APPLN. INFO.:			US 2001-966158	A 20010928
			WO 2002-US30729	W 20020927

OTHER SOURCE(S) : CASREACT 138:289365

AB Methods and materials are provided for the production of essentially isomerically pure perhalogenated and partially halogenated compds. One embodiment of the present invention provides a process for the production of essentially isomerically pure CFC-216aa. Other embodiments include processes for the production of CFC-217ba and HFC-227ea. Particular embodiments of the present invention provide separation techniques for the separation of chlorofluorocarbons from HF, from other chlorofluorocarbons, and the separation of isomers of halogenated compds. Still other embodiments of the present invention provide catalytic synthetic techniques that demonstrate extended catalyst lifetime. In other embodiments, the present invention provides catalytic techniques for the purification of isomeric mixts.

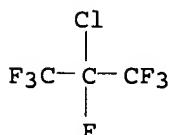
IT 76-18-6P, 2-Chloroheptafluoropropane

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)

(materials and methods for the production and purification of chlorofluorocarbons and hydrofluorocarbons)

RN 76-18-6 CAPLUS

CN Propane, 2-chloro-1,1,1,2,3,3-heptafluoro- (9CI) (CA INDEX NAME)



L5 ANSWER 7 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 1999:659343 CAPLUS  
 DOCUMENT NUMBER: 131:273398  
 TITLE: Processes for the distillative purification and use of 2,2-dichloro-1,1,1,3,3-heptafluoropropane and its

azeotropes with HF in the manufacture of  
 2-chloro-1,1,1,2,3,3,3-heptafluoropropane and  
 1,1,1,3,3,3-hexafluoropropane  
**INVENTOR(S):** Miller, Ralph Newton; Rao, V. N. Mallikarjuna;  
 Swearingen, Steven H.  
**PATENT ASSIGNEE(S):** E. I. Du Pont de Nemours & Co., USA  
**SOURCE:** PCT Int. Appl., 16 pp.  
**CODEN:** PIXXD2  
**DOCUMENT TYPE:** Patent  
**LANGUAGE:** English  
**FAMILY ACC. NUM. COUNT:** 1  
**PATENT INFORMATION:**

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9951556	A2	19991014	WO 1999-US7224	19990401
W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
AU 9933778	A1	19991025	AU 1999-33778	19990401
EP 1068170	A2	20010117	EP 1999-915209	19990401
R: DE, FR, GB				
US 6211135	B1	20010403	US 1999-283448	19990401
JP 2002510665	T2	20020409	JP 2000-542279	19990401
PRIORITY APPLN. INFO.:			US 1998-80710P	P 19980403
			WO 1999-US7224	W 19990401

AB The separation of a mixture of HF and CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> involves placing the mixture in a

separation zone at 0-100° and at a pressure sufficient to maintain the mixture in the liquid phase, where an organic-enriched phase comprising <69 mol percent HF is formed as the bottom layer and an HF-enriched phase comprising >90 mol percent HF is formed as the top layer. The organic-enriched phase can be withdrawn from the bottom of the separation zone

and

subjected to distillation in a distillation column to recover essentially pure CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub>. The distillate comprising HF and CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> can be removed from the top of the distillation column, while essentially pure CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> can be recovered from the bottom of the distillation column. Also, the HF-enriched phase can be withdrawn from the top of the separation zone and subjected to distillation in a distillation column. The distillate comprising HF and CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub>

can be removed from the top of the distillation column while essentially pure HF

HF two can be recovered from the bottom of the distillation column; if desired, the

distillates can be recycled to the separation zone.. Also disclosed are compns. of hydrogen fluoride in combination with an effective amount of about 13.8 to 31.3 mol percent CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> to form an azeotrope or azeotrope-like composition with hydrogen fluoride. Also disclosed is a process for producing

1,1,1,3,3,3-hexafluoropropane from a mixture comprising HF and CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> by preparing essentially pure CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> as indicated above, and reacting the CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> with hydrogen.. Another process for producing 1,1,1,3,3,3-hexafluoropropane comprises contacting an azeotrope of CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> as indicated above with hydrogen and reacting the CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub> with hydrogen in the presence of HF.

IT 76-18-6P, Propane, 2-chloro-1,1,1,2,3,3,3-heptafluoro-

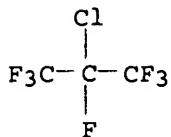
RL: IMF (Industrial manufacture); PREP (Preparation)

(processes for the distillative purification and use of 2,2-dichloro-1,1,1,3,3,3-hexafluoropropane and its azeotropes with HF in the manufacture

of 2-chloro-1,1,1,2,3,3,3-heptafluoropropane and 1,1,1,3,3,3-hexafluoropropane)

RN 76-18-6 CAPLUS

CN Propane, 2-chloro-1,1,1,2,3,3,3-heptafluoro- (9CI) (CA INDEX NAME)



L5 ANSWER 8 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 1999:659342 CAPLUS

DOCUMENT NUMBER: 131:272325

TITLE: Processes for the distillative purification and use of 2-chloro-1,1,1,2,3,3,3-heptafluoropropane and its azeotropes with HF in the manufacture of hexafluoropropene and 1,1,1,2,3,3,3-heptafluoropropane

INVENTOR(S): Miller, Ralph Newton; Rao, V. N. Mallikarjuna; Swearingen, Steven H.

PATENT ASSIGNEE(S): E. I. Du Pont de Nemours & Co., USA

SOURCE: PCT Int. Appl., 18 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9951555	A1	19991014	WO 1999-US7225	19990401
W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
AU 9933779	A1	19991025	AU 1999-33779	19990401
EP 1066230	A1	20010110	EP 1999-915210	19990401
EP 1066230	B1	20030910		
R: BE, DE, ES, FR, GB, IT, NL				
JP 2002510664	T2	20020409	JP 2000-542278	19990401
US 6677493	B1	20040113	US 1999-283449	19990401
ES 2203107	T3	20040401	ES 1999-915210	19990401
PRIORITY APPLN. INFO.:			US 1998-80709P	P 19980403
			WO 1999-US7225	W 19990401

AB The separation of a mixture of HF and CF<sub>3</sub>CClFCF<sub>3</sub> involves placing the mixture in a

separation zone at a temperature of from about -30° to about +100° and at a pressure sufficient to maintain the mixture in the liquid phase, so that an organic-enriched phase comprising <50 mol percent HF is formed as the bottom layer and an HF-enriched phase comprising >90 mol percent HF is formed as the top layer. The organic-enriched phase is withdrawn from the bottom of the separation zone and subjected to distillation in a distillation column to

recover essentially pure CF<sub>3</sub>CClFCF<sub>3</sub>. The distillate comprising HF and CF<sub>3</sub>CClFCF<sub>3</sub> can be removed from the top of the distillation column while essentially pure CF<sub>3</sub>CClFCF<sub>3</sub> can be recovered from the bottom of the distillation

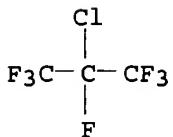
column. The HF-enriched phase can be withdrawn from the top of the separation

zone and subjected to distillation in a distillation column. The distillate comprising HF and CF<sub>3</sub>CClFCF<sub>3</sub> can be removed from the top of the distillation column while essentially pure HF can be recovered from the bottom of the distillation column. If desired, the two distillates can be recycled back to the separation zone. Also disclosed are compns. of hydrogen fluoride in combination with an effective amount of CF<sub>3</sub>CClFCF<sub>3</sub> to form an azeotrope-like composition with HF; included are compns. containing 38.4-47.9 mol percent CF<sub>3</sub>CClFCF<sub>3</sub>. Also disclosed are processes for producing 1,1,1,2,3,3,3-heptafluoropropane and hexafluoropropene.

IT 76-18-6P, Propane, 2-Chloro-1,1,1,2,3,3,3-heptafluoro-  
 RL: PUR (Purification or recovery); RCT (Reactant); PREP  
 (Preparation); RACT (Reactant or reagent)  
 (processes for the distillative purification and use of 2-chloro-  
 1,1,1,2,3,3,3-heptafluoropropane and its azeotropes with HF in the  
 manufacture of hexafluoropropene and 1,1,1,2,3,3,3-heptafluoropropane)

RN 76-18-6 CAPLUS

CN Propane, 2-chloro-1,1,1,2,3,3,3-heptafluoro- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 9 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 1999:659340 CAPLUS  
 DOCUMENT NUMBER: 131:258061  
 TITLE: Process for the production of hexafluoropropylene and 1,1,1,2,3,3,3-heptafluoropropane  
 INVENTOR(S): Manogue, William H.; Nappa, Mario Joseph; Sievert, Allen Capron  
 PATENT ASSIGNEE(S): E. I. Du Pont de Nemours & Co., USA  
 SOURCE: PCT Int. Appl., 16 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9951553	A1	19991014	WO 1999-US7230	19990401
W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
AU 9933780	A1	19991025	AU 1999-33780	19990401
US 6018083	A	20000125	US 1999-283450	19990401
EP 1068167	A1	20010117	EP 1999-915212	19990401
EP 1068167	B1	20030903		
R: BE, DE, ES, FR, GB, IT, NL				
JP 2002510662	T2	20020409	JP 2000-542276	19990401
ES 2203108	T3	20040401	ES 1999-915212	19990401
PRIORITY APPLN. INFO.:			US 1998-80708P	P 19980403
			WO 1999-US7230	W 19990401

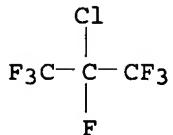
AB Hexafluoropropylene and 1,1,1,2,3,3,3-heptafluoropropane are manufactured by:

(A) feeding 1,1,2-trichloro-3,3,3-trifluoro-1-propene, HF, and Cl<sub>2</sub> to a first reaction zone containing a trivalent chromium catalyst operated at 250-325° to produce an effluent comprising C<sub>3</sub>Cl<sub>3</sub>F<sub>5</sub>, C<sub>3</sub>Cl<sub>2</sub>F<sub>6</sub>, CF<sub>3</sub>CClFCF<sub>3</sub>, HCl, and HF; (B) the effluent of step A is distilled to produce (i) a low-boiling stream including HCl, (ii) a reactant stream including an azeotrope of 2-chloro-1,1,1,2,3,3-heptafluoropropane and HF, and (iii) a high-boiling stream including C<sub>3</sub>Cl<sub>2</sub>F<sub>6</sub> and C<sub>3</sub>Cl<sub>3</sub>F<sub>5</sub>; (C) 2-chloro-1,1,1,2,3,3-heptafluoropropane of reactant stream (ii) is reacted with hydrogen in the presence of a catalyst to produce a mixture of hexafluoropropylene and 1,1,1,2,3,3-heptafluoropropane; (D) the C<sub>3</sub>Cl<sub>2</sub>F<sub>6</sub> and C<sub>3</sub>Cl<sub>3</sub>F<sub>5</sub> of high-boiling stream (iii) are fed along with HF to a second reaction zone containing a trivalent chromium catalyst and operated at ≥375° to produce a reaction product comprising CF<sub>3</sub>CClFCF<sub>3</sub> and HF; and (E) the product mixture of step D is recycled to step A. A process flow diagram is presented.

IT 76-18-6P, Propane, 2-Chloro-1,1,1,2,3,3-heptafluoro-  
RL: IMF (Industrial manufacture); PUR (Purification or recovery); RCT  
(Reactant); PREP (Preparation); RACT (Reactant or reagent)  
(process for the production of hexafluoropropylene and 1,1,1,2,3,3,3-  
heptafluoropropane using)

RN 76-18-6 CAPLUS

CN Propane, 2-chloro-1,1,1,2,3,3-heptafluoro- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

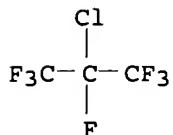
L5 ANSWER 10 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 1993:602977 CAPLUS  
 DOCUMENT NUMBER: 119:202977  
 TITLE: Synthesis of perfluoropropane  
 INVENTOR(S): Webster, James L.; Swearingen, Steven H.; Bruhnke,  
 Douglas W.; Manzer, Leo E.; McCann, Elrey L.  
 PATENT ASSIGNEE(S): du Pont de Nemours, E. I., and Co., USA  
 SOURCE: U.S., 6 pp. Cont. of U.S. Ser. No. 734,016, abandoned.  
 CODEN: USXXAM  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5220083	A	19930615	US 1992-826296	19920128
PRIORITY APPLN. INFO.:			US 1989-452403	B1 19891219
			US 1991-734016	B1 19910722

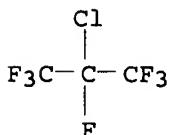
OTHER SOURCE(S): CASREACT 119:202977

AB A process carried out in the vapor phase for the preparation of perfluoropropane consisting essentially of reacting propane, propylene and partially or totally halogenated C-3 acyclic hydrocarbons with HF and Cl<sub>2</sub> at a temperature of 100-550° in amts. such that the ratio of HF to Cl<sub>2</sub> is between 1 and 7, in the presence of a solid metal-containing salt or oxide catalyst; and recovering the perfluoropropane is claimed. Thus, propylene was treated with excess HF in a tubular reactor over CrO<sub>x</sub>/Cr<sub>2</sub>O<sub>3</sub> at 445° with a contact time of 0.30 s, using a flow of 35 mL/min HF, 15 mL/min Cl<sub>2</sub>, and 1.0 mL/min propylene to give 25% F<sub>3</sub>CF<sub>2</sub>CF<sub>3</sub>, 35% C<sub>3</sub>F<sub>7</sub>Cl, and 41% CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub>, along with 0.4% low mol. weight degradation products.

IT Therefore, the yield to F<sub>3</sub>CF<sub>2</sub>CF<sub>3</sub> and recyclables was 99%.  
 IT 76-18-6P, 2-Chloroheptafluoropropane  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (preparation of, by chromium oxide-catalyzed chlorofluorination of propylene)  
 RN 76-18-6 CAPLUS  
 CN Propane, 2-chloro-1,1,1,2,3,3,3-heptafluoro- (9CI) (CA INDEX NAME)



L5 ANSWER 11 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 1993:59239 CAPLUS  
 DOCUMENT NUMBER: 118:59239  
 TITLE: Reaction of organic compounds with a sulfur tetrafluoride-hydrogen fluoride -halogenating agent system. VII. Reactions of olefins with the SF<sub>4</sub>-HF-Cl<sub>2</sub>(Br<sub>2</sub>) system  
 AUTHOR(S): Kunshenko, V. B.; Mohamed, Nagib Muhtar; Omarov, V. O.; Muratov, N. N.; Yagupol'skii, L. N.  
 CORPORATE SOURCE: Odess. Politekh. Inst., Odessa, Ukraine  
 SOURCE: Zhurnal Organicheskoi Khimii (1992), 28(4), 672-80  
 CODEN: ZORKAE; ISSN: 0514-7492  
 DOCUMENT TYPE: Journal  
 LANGUAGE: Russian  
 OTHER SOURCE(S): CASREACT 118:59239  
 AB Halogenated alkenes undergo halofluorination in SF<sub>4</sub>-HF-Cl<sub>2</sub>(Br<sub>2</sub>) systems. On the basis of Z- and E-1,2-dichloroethenes it was shown that these reactions proceed with anti stereospecificity via bromonium ions. The accumulation of Cl atoms in the alkene mol. hinders electrophilic addition of stoichiometric equivs. of ClF and BrF to the double bond. The SF<sub>4</sub>-HF-Br<sub>2</sub> system is effective in fluorinating Br-containing organic compds., wherein only Br atoms on a secondary C are substituted by F.  
 IT 76-18-6P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (preparation of, by halogenation of alkene in sulfur tetrafluoride-hydrogen fluoride-halogen system)  
 RN 76-18-6 CAPLUS  
 CN Propane, 2-chloro-1,1,1,2,3,3,3-heptafluoro- (9CI) (CA INDEX NAME)

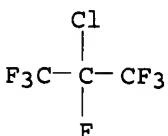


L5 ANSWER 12 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 1992:20676 CAPLUS  
 DOCUMENT NUMBER: 116:20676  
 TITLE: Multistep synthesis of hexafluoropropylene from propane and propylene  
 INVENTOR(S): Webster, James Lang; McCann, Elrey Lorne; Bruhnke, Douglas William; Lerou, Jan Joseph; Manogue, William Henry; Manzer, Leo Ernest; Swearingen, Steven Henry; Trofimenko, Swiatoslav; Bonifaz, Cristobal

PATENT ASSIGNEE(S) : du Pont de Nemours, E. I., and Co., USA  
 SOURCE: Eur. Pat. Appl., 33 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 434409	A1	19910626	EP 1990-313951	19901219
EP 434409	B1	19941012		
R: DE, FR, GB, IT				
US 5057634	A	19911015	US 1989-452402	19891219
CA 2032273	AA	19910620	CA 1990-2032273	19901214
CA 2032273	C	20020122		
CA 2298099	C	20020108	CA 1990-2298099	19901214
JP 04145033	A2	19920519	JP 1990-411690	19901219
JP 2613683	B2	19970528		
PRIORITY APPLN. INFO.:			US 1989-452402	A 19891219
			CA 1990-2032273	A3 19901214

AB Hexafluoropropylene (I) is prepared by (1) chlorofluorination of at least one of propane, propylene, and partially halogenated C3 acyclic hydrocarbons with HF and Cl in the presence of a chlorofluorination catalyst to produce CF<sub>3</sub>CFClCF<sub>3</sub> (II) and other chlorofluorocarbons such as C<sub>3</sub>F<sub>4</sub>Cl<sub>4</sub>, C<sub>3</sub>H<sub>5</sub>Cl<sub>3</sub>, CF<sub>3</sub>CFClCF<sub>2</sub>Cl, CF<sub>3</sub>CCl<sub>2</sub>CF<sub>3</sub>, and CF<sub>3</sub>CCl<sub>2</sub>CCl<sub>3</sub> which are mostly recyclable to the same chlorofluorination step to give II and (2) dehalogenation of II to form I in the presence of a CuO-NiO-Cr<sub>2</sub>O<sub>3</sub>-CaF<sub>2</sub> (and-MoO<sub>3</sub>) catalyst containing at least one of K, Cs, or Rb. In this process there is substantially no perfluoroisobutylene produced as a byproduct which is extremely toxic and is costly to remove and destroy. Thus, Cr<sub>2</sub>O<sub>3</sub>.3H<sub>2</sub>O was charged to an Inconel tubular reactor and treated with a flow of HF at 400° for dehydration and thereto HF 90, Cl 35, and propylene 1.5 mol/h were fed at 440° and 790 kPa to give II 75, C<sub>3</sub>F<sub>6</sub>Cl<sub>2</sub> 7, C<sub>3</sub>F<sub>5</sub>Cl<sub>3</sub> 5, C<sub>3</sub>F<sub>7</sub>H 3, C<sub>3</sub>F<sub>6</sub>ClH 5, C<sub>3</sub>F<sub>8</sub> 2 and C<sub>2</sub>F<sub>5</sub>Cl 2%. A 1:1 (mol) mixture of H and a II feed containing II 79, CF<sub>3</sub>CF<sub>2</sub>CF<sub>2</sub>Cl 17, and CF<sub>3</sub>CCl:CF<sub>2</sub> 0.7% was passed over a catalyst CuO/NiO/Cr<sub>2</sub>O<sub>3</sub>/2.7 CaF<sub>2</sub> containing 7.9 weight% K at 402° to give 97% I with 63% conversion of II.  
 IT 76-18-6P, 2-Chloro-1,1,1,3,3-hexafluoropropane  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (preparation and dehalogenation of, hexafluoropropylene from)  
 RN 76-18-6 CAPLUS  
 CN Propane, 2-chloro-1,1,1,2,3,3-heptafluoro- (9CI) (CA INDEX NAME)



L5 ANSWER 13 OF 13 CAPLUS COPYRIGHT 2005 ACS on STN  
 ACCESSION NUMBER: 1991:558499 CAPLUS  
 DOCUMENT NUMBER: 115:158499  
 TITLE: Multistep synthesis of hexafluoropropylene  
 INVENTOR(S): Webster, James Lang; Trofimenko, Swiatoslav; Resnick, Paul Raphael; Bruhnke, Douglas William; Lerou, Jan Joseph; Manogue, William Henry; Manzer, Leo Ernest; McCann, Elrey Lorne; Swearingen, Steven Henry; et al.  
 PATENT ASSIGNEE(S): du Pont de Nemours, E. I., and Co., USA  
 SOURCE: Eur. Pat. Appl., 12 pp.

CODEN: EPXXDW

DOCUMENT TYPE:

Patent

LANGUAGE:

English

FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 434408	A1	19910626	EP 1990-313950	19901219
EP 434408	B1	19940420		
R: DE, FR, GB, IT				
US 5068472	A	19911126	US 1989-452404	19891219
CA 2032278	AA	19910620	CA 1990-2032278	19901214
CA 2032278	C	20010529		
JP 04108746	A2	19920409	JP 1990-411751	19901219
JP 2613684	B2	19970528		

PRIORITY APPLN. INFO.: US 1989-452404 A 19891219

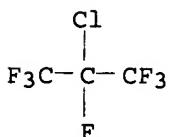
AB Claimed is a process for the preparation of hexafluoropropylene comprising: a) fluorinating or chlorofluorinating  $\text{CCl}_3\text{CCl}:\text{CCl}_2$  in the presence of a catalyst by contacting  $\text{CCl}_3\text{CCl}:\text{CCl}_2$  with chlorine and/or hydrogen fluoride (HF) to produce perhalogenated fluorocarbons; b) hydrofluorinating any unsatd. chlorofluorocarbons of step (a) by contacting with excess HF in the presence of a metal-containing catalyst to saturated perhalogenated chlorofluorocarbons; c) fluorinating the saturated perhalogenated chlorofluorocarbons resulting from steps (a) and (b) by contacting with HF in the presence of a metal-containing catalyst to produce  $\text{CF}_3\text{CFCl}_1\text{CF}_3$ ; and d) hydrodehalogenating said  $\text{CF}_3\text{CFCl}_1\text{CF}_3$  by contacting with hydrogen in the presence of a potassium-containing catalyst. Hydrogenation of  $\text{CF}_3\text{CFCl}_1\text{CF}_3$  in hydrogen over a catalyst containing  $\text{CuO}$ ,  $\text{NiO}$ ,  $\text{Cr}_2\text{O}_3$ , and  $\text{CaF}_2$  (which was conditioned with hydrogen at  $550^\circ$  for 1 h) gave hexafluoropropylene (I) with 20% conversion of  $\text{CF}_3\text{CFCl}_1\text{CF}_3$ . In the presence of a catalyst containing  $\text{CuO}$ ,  $\text{NiO}$ ,  $\text{Cr}_2\text{O}_3$ ,  $\text{CaF}_2$ , and 7.9 weight% K, the yield of I was slightly superior to that obtained with similar catalysts containing 4.6, 8.9, 9.6, and 15.1% K.

IT 76-18-6P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(preparation and conversion of, to hexafluoropropylene)

RN 76-18-6 CAPLUS

CN Propane, 2-chloro-1,1,1,2,3,3-heptafluoro- (9CI) (CA INDEX NAME)



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(FILE 'HOME' ENTERED AT 10:13:55 ON 01 OCT 2005)

FILE 'REGISTRY' ENTERED AT 10:14:23 ON 01 OCT 2005

L1 STRUCTURE UPLOADED

L2 3 S L1 SSS FULL

FILE 'CAPLUS' ENTERED AT 10:15:48 ON 01 OCT 2005

L3 67 S L2

L4 27 S L2/PREP

L5 13 S L4 AND HYDROGEN FLUORIDE

L6 8 S L5 AND CHLORINE

=> s 14 and chromium  
348780 CHROMIUM  
72 CHROMIUMS  
348783 CHROMIUM  
(CHROMIUM OR CHROMIUMS)  
L7 11 L4 AND CHROMIUM

=> s 17 and (nickel or cobalt)  
586415 NICKEL  
195 NICKELS  
586442 NICKEL  
(NICKEL OR NICKELS)  
357244 COBALT  
95 COBALTS  
357247 COBALT  
(COBALT OR COBALTS)  
L8 9 L7 AND (NICKEL OR COBALT)

=> s 18 not 15  
L9 1 L8 NOT L5

=> d 19 ibib ab hitstr

L9 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 1991:558500 CAPLUS  
DOCUMENT NUMBER: 115:158500  
TITLE: Multistep synthesis of hexafluoropropylene  
INVENTOR(S): Lerou, Jan Joseph; Manzer, Leo Ernest; Manogue, William Henry; Resnick, Paul Raphael; Trofimenko, Swiatoslaw; Webster, James Lang; McCann, Elroy Lorne; Bruhnke, Douglas William  
PATENT ASSIGNEE(S): du Pont de Nemours, E. I., and Co., USA  
SOURCE: Eur. Pat. Appl., 14 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 434407	A1	19910626	EP 1990-313949	19901219
EP 434407	B1	19940622		
R: DE, FR, GB, IT				
US 5043491	A	19910827	US 1989-452401	19891219
CA 2032250	AA	19910620	CA 1990-2032250	19901214
CA 2032250	C	20010703		
JP 04117335	A2	19920417	JP 1990-412153	19901219
JP 2613685	B2	19970528		

PRIORITY APPLN. INFO.: US 1989-452401 A 19891219  
AB CF<sub>3</sub>CF:CF<sub>2</sub> (I) was prepared by chlorofluorination of a feed containing at least one of propane, propylene and partially halogenated three-carbon acyclic hydrocarbons, followed by treatment of the resulting CF<sub>3</sub>CCl:CCl<sub>2</sub> with HF and chlorine and dehalogenation of the resulting CF<sub>3</sub>CFClCF<sub>3</sub>. A 1:1 M mixture of hydrogen and CF<sub>3</sub>CFClCF<sub>3</sub> (II) was passed over a BaCrO<sub>4</sub>-modified copper chromite catalyst at 400° and atmospheric pressure to give I with 60 to 70% conversion of II.  
IT 76-18-6P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(preparation of, in preparation of hexafluoropropylene)  
RN 76-18-6 CAPLUS  
CN Propane, 2-chloro-1,1,1,2,3,3-heptafluoro- (9CI) (CA INDEX NAME)

